CLAIMS

What is claimed is:

1. A low power transmitter comprises:

signal generator operably ccupled to generate a signal to represent data based on an aspect of a transmission protocol;

signal partitioning module cperably coupled to partition the signal based on peak-to-average ratio of the signal to produce a plurality of signal partitions;

signal processing module operably coupled to process each of the plurality of signal partitions based on a second aspect of the transmission protocol to produce a plurality of processed signal partitions;

plurality of amplifiers, wherein each of the plurality of the amplifiers amplifies a corresponding one of the plurality of processed signal partitions to produce a plurality of amplified signal partitions; and

transmitting module operably coupled to transmit the plurality of amplified signal partitions as a composite amplified signal.

2. The low power transmitter of claim 1, wherein the signal generator further comprises:

symbol generator operably coupled to produce symbols that represent the data in a frequency domain based on the aspect of the transmission protocol;

frequency-to-time conversion module operably coupled to convert the symbols into a time domain signal; and

filtering module operably coupled to filter the time domain signal to produce the signal, wherein the transmission protocol includes at least one of: orthogonal frequency division multiplexing (OFDM), binary phase shift keying (BPSK), quadrature phase shift keying (QPSK), quadrature amplitude modulation (QAM), and discrete multi-tone (DMT).

3. The low power transmitter of claim 2, wherein the transmitting module further comprises:

summing module operably coupled to sum the plurality of amplified signal partitions to produce a transmission signal; and

antenna operably coupled to transmit, as a radio frequency signal, the transmission signal.

4. The low power transmitter of claim 2, wherein the transmitting module further comprises:

plurality of antennas that correspondingly transmits the plurality of amplified signal partitions such that, when transmitted, the plurality of amplified signal partitions sum together in air to produce the composite signal.

5. The low power transmitter of claim 2 further comprises:

the signal partitioning module including:

signal slicing module cperably coupled to produce the plurality of signal partitions based on magnitude of the signal, wherein the signal slicing module slices the signal at a first level to produce a first signal partition of the plurality of signal partitions, and wherein the signal slicing module slices the signal between the first level and a second level to produce a second signal partition of the plurality of signal partitions;

the signal processing module including:

first digital to analog converter operably coupled to convert the first signal partition into a first analog signal;

second digital to analog converter operably coupled to convert the second signal partition into a second analog signal;

first RF up-conversion section operably coupled to convert the first analog signal into a first RF signal; and

second RF up-conversion section operably coupled to convert the second analog signal into a second RF signal.

6. The low power transmitter of claim 5 further comprises:

the first signal partition including an in-phase (I) component and a quadrature (Q) component;

the second signal partition including an I component and a Q component;

the first digital to analog converter including:

a first I digital to analog conversion module operably coupled to convert the I component of the first signal partition into an I component of the first analog signal;

a first Q digital to analog conversion module operably coupled to convert the Q component of the first signal partition into a Q component of the first analog signal;

the second digital to analog converter including:

a second I digital to analog conversion module operably coupled to convert the I component of the second signal partition into an I component of the second analog signal;

a second Q digital to analog conversion module operably coupled to convert the Q component of the

second signal partition into a Q component of the second analog signal.

7. The low power transmitter of claim 2 further comprises:

the signal partitioning module including:

signal slicing module cperably coupled to produce the plurality of signal partitions based on magnitude of the signal, wherein the signal slicing module slices the signal at a first level to produce a first signal partition of the plurality of signal partitions, and wherein the signal slicing module slices the signal between the first level and a second level to produce a second signal partition of the plurality of signal partitions;

first up-converting mixing module operably coupled to mix the first signal partition with a first reference frequency to produce a first mixed signal partition;

second up-converting mixing module operably coupled to mix the second signal partition with a second reference frequency to produce a second mixed signal partition;

the signal processing module including:

summing module operably coupled to sum the first and second mixed signal partitions to produce a summed partitioned signal;

digital to analog converter operably coupled to convert the summed partitioned signal into an analog signal;

RF up-conversion section operably coupled to convert the analog signal into an RF signal;

first down-conversion mixing module operably coupled to mix the RF signal with the first reference frequency to produce a first processed signal partition of the plurality of processed signal partitions; and

second down-conversion mixing module operably coupled to mix the RF signal with the second reference frequency to produce a second processed signal partition of the plurality of processed signal partitions.

8. The low power transmitter of claim 1 further comprises:

the signal generator including:

symbol generator operably coupled to produce symbols that represent the data in a frequency domain based on the aspect of the transmission protocol;

the signal partitioning module including:

channel separator operably coupled to divide channels of symbols into a plurality of sub-channels of symbols for each of the channels;

the signal processing module including:

plurality of frequency-to-time conversion modules that correspondingly convert the symbols of each of the plurality of sub-channels into a plurality of time domain signal partitions; and

plurality of filtering modules that correspondingly filter the plurality of time domain signal partitions to produce a plurality of filtered signal partitions;

plurality of digital tc analog converters that correspondingly convert the plurality of filtered signal partitions into a plurality of analog signals; and

plurality of RF up-conversion sections that correspondingly convert the plurality of analog signals into a plurality of RF signals as the plurality of processed signal partitions.

9. The low power transmitter of claim 1, wherein each of the plurality of amplifiers further comprises:

Class A power amplifier having a selected output impedance.

10. A low power transmitter comprises:

signal generator operably coupled to generate a signal to represent data based on an aspect of a transmission protocol;

digital to analog converter operably coupled to convert the signal into an analog signal;

radio frequency (RF) up-conversion section operably coupled to up-convert frequency of the analog signal to produce an RF signal;

plurality of amplifiers operably coupled to amplify the RF signal based on gating signals; and

gating signal module operably coupled to produce the gating signals based on magnitude of at least one of: the signal, the analog signal, and the RF signal such that the gating signal module enables one or more of the plurality of amplifiers to amplify the RF signal.

11. The low power transmitter of claim 10, wherein the gating signal module further comprises:

digital comparator module operably coupled to compare the signal with at least one magnitude threshold to produce at least one indication of magnitude of the signal; and

disabling circuit operably coupled to at least some of the plurality of amplifiers, wherein the disabling circuit disables the at least some of the plurality of amplifiers

when the indication of magnitude is below the at least one magnitude threshold and enables at least one of the at least some of the plurality of amplifiers when the indication of magnitude is above the at least one magnitude threshold.

12. The low power transmitter of claim 10, wherein the gating signal module further comprises:

analog comparator module operably coupled to compare the analog signal with at least one magnitude threshold to produce at least one indication of magnitude of the signal; and

disabling circuit operably coupled to at least some of the plurality of amplifiers, wherein the disabling circuit disables the at least some cf the plurality of amplifiers when the indication of magnitude is below the at least one magnitude threshold and enables at least one of the at least some of the plurality of amplifiers when the indication of magnitude is above the at least one magnitude threshold.

13. The low power transmitter of claim 10, wherein the gating signal module further comprises:

comparator module operably coupled to compare the signal or the analog signal with at least one magnitude threshold to produce at least one indication of magnitude of the signal; and

plurality of biasing circuit that correspondingly bias the plurality of amplifiers based on the at least one indication of the magnitude of the signal.

14. The low power transmitter of claim 10 further comprises:

summing module operably coupled to sum outputs of the plurality of amplifiers to produce a transmission signal; and

antenna operably coupled to transmit, as a radio frequency signal, the transmission signal.

15. The low power transmitter of claim 10 further comprises:

plurality of antennas that correspondingly transmits outputs of the plurality of amplifiers such that, when transmitted, the outputs of the plurality of amplifiers sum together in air to produce a composite RF signal.

16. A method for low power transmissions, the method comprises:

generating a signal to represent data based on an aspect of a transmission protocol;

partitioning the signal based on peak-to-average ratio of the signal to produce a plurality of signal partitions;

processing each of the plurality of signal partitions based on a second aspect of the transmission protocol to produce a plurality of processed signal partitions; and

providing the plurality of processed signal partitions to a plurality of amplifiers such that each of the plurality of the amplifiers amplifies a corresponding one of the plurality of processed signal partitions.

17. The method of claim 16, wherein the generating the signal further comprises:

producing symbols that represent the data in a frequency domain based on the aspect of the transmission protocol;

frequency-to-time converting the symbols into a time domain signal; and

filtering the time domain signal to produce the signal, wherein the transmission protocol includes at least one of: orthogonal frequency division multiplexing (OFDM), binary phase shift keying (BPSK), quadrature phase shift keying

(QPSK), quadrature amplitude modulation (QAM), and discrete multi-tone (DMT).

18. The method of claim 16 further comprises:

partitioning the signal by:

slicing the signal at a first level to produce a first signal partition of the plurality of signal partitions;

slicing the signal between the first level and a second level to produce a second signal partition of the plurality of signal partitions;

processing the plurality of signal partitions by:

converting the first signal partition into a first analog signal;

converting the second signal partition into a second analog signal;

up-converting the first analog signal into a first RF signal; and

up-converting the second analog signal into a second RF signal.

19. The method of claim 18 further comprises:

converting an I component of the first signal partition into an I component of the first analog signal;

converting a Q component of the first signal partition into a Q component of the first analog signal;

converting an I component of the second signal partition into an I component of the second analog signal;

converting a Q component of the second signal partition into a Q component of the second analog signal.

20. The method of claim 17 further comprises:

partitioning the signal by:

slicing the signal at a first level to produce a first signal partition of the plurality of signal partitions;

slicing the signal between the first level and a second level to produce a second signal partition of the plurality of signal partitions;

up-conversion mixing the first signal partition with a first reference frequency to produce a first mixed signal partition;

up-conversion mixing the second signal partition with a second reference frequency to produce a second mixed signal partition;

processing the signal by:

summing the first and second mixed signal partitions to produce a summed partitioned signal;

converting the summed partitioned signal into an analog signal;

RF up-converting the analog signal into an RF signal;

down-conversion mixing the RF signal with the first reference frequency to produce a first processed signal partition of the plurality of processed signal partitions; and

down-conversion mixing the RF signal with the second reference frequency to produce a second processed signal partition of the plurality of processed signal partitions.

21. The method of claim 16 further comprises:

generating the signal by:

producing symbols that represent the data in a frequency domain based on the aspect of the transmission protocol;

partitioning the signal by:

dividing channels of symbols into a plurality of sub-channels of symbols for each of the channels;

processing the signal by:

correspondingly converting the symbols of each of the plurality of sub-channels into a plurality of time domain signal partitions; and

correspondingly filtering the plurality of time domain signal partitions to produce a plurality of filtered signal partitions;

correspondingly converting the plurality of filtered signal partitions into a plurality of analog signals; and

correspondingly converting the plurality of analog signals into a plurality of RF signals as the plurality of processed signal partitions.

22. An apparatus for low power transmissions, the apparatus comprises:

processing module; and

memory operably coupled to the processing module, wherein the memory includes operational instructions that cause the processing module to:

generate a signal to represent data based on an aspect of a transmission protocol;

partition the signal based on peak-to-average ratio of the signal to produce a plurality of signal partitions;

process each of the plurality of signal partitions based on a second aspect of the transmission protocol to produce a plurality of processed signal partitions; and

provide the plurality of processed signal partitions to a plurality of amplifiers such that each of the plurality of the amplifiers amplifies a corresponding one of the plurality of processed signal partitions.

23. The apparatus of claim 22, wherein the memory further comprises operational instructions that cause the processing module to generate the signal by:

producing symbols that represent the data in a frequency domain based on the aspect of the transmission protocol;

frequency-to-time converting the symbols into a time domain signal; and

filtering the time domain signal to produce the signal, wherein the transmission protocol includes at least one of: orthogonal frequency division multiplexing (OFDM), binary phase shift keying (BPSK), quadrature phase shift keying (QPSK), quadrature amplitude modulation (QAM), and discrete multi-tone (DMT).

24. The apparatus of claim 22, wherein the memory further comprises operational instructions that cause the processing module to:

partition the signal by:

slicing the signal at a first level to produce a first signal partition of the plurality of signal partitions;

slicing the signal between the first level and a second level to produce a second signal partition of the plurality of signal partitions;

process the plurality of signal partitions by:

converting the first signal partition into a first analog signal;

converting the second signal partition into a second analog signal;

up-converting the first analog signal into a first RF signal; and

up-converting the second analog signal into a second RF signal.

25. The apparatus of claim 24, wherein the memory further comprises operational instructions that cause the processing module to:

convert an I component of the first signal partition into an I component of the first analog signal;

convert a Q component of the first signal partition into a Q component of the first analog signal;

convert an I component of the second signal partition into an I component of the second analog signal;

convert a Q component of the second signal partition into a Q component of the second analog signal.

26. The apparatus of claim 23, wherein the memory further comprises operational instructions that cause the processing module to:

partition the signal by:

slicing the signal at a first level to produce a first signal partition of the plurality of signal partitions;

slicing the signal between the first level and a second level to produce a second signal partition of the plurality of signal partitions;

up-conversion mixing the first signal partition with a first reference frequency to produce a first mixed signal partition;

up-conversion mixing the second signal partition with a second reference frequency to produce a second mixed signal partition;

process the signal by:

summing the first and second mixed signal partitions to produce a summed partitioned signal;

converting the summed partitioned signal into an analog signal;

RF up-converting the analog signal into an RF signal;

down-conversion mixing the RF signal with the first reference frequency to produce a first processed signal partition of the plurality of processed signal partitions; and

down-conversion mixing the RF signal with the second reference frequency to produce a second processed signal partition of the plurality of processed signal partitions.

27. The apparatus of claim 22, wherein the memory further comprises operational instructions that cause the processing module to:

generate the signal by:

producing symbols that represent the data in a frequency domain based on the aspect of the transmission protocol;

partition the signal by:

dividing channels of symbols into a plurality of sub-channels of symbols for each of the channels;

process the signal by:

correspondingly converting the symbols of each of the plurality of sub-channels into a plurality of time domain signal partitions; and

correspondingly filtering the plurality of time domain signal partitions to produce a plurality of filtered signal partitions;

correspondingly converting the plurality of filtered signal partitions into a plurality of analog signals; and

correspondingly converting the plurality of analog signals into a plurality of RF signals as the plurality of processed signal partitions.